Loop Related Problems

Basic Questions:

1. Write a program to print numbers from 1 to 10.
2. Write a program to calculate the sum of the first 10 natural numbers.
3. Write a program that prompts the user to input a positive integer. It should then print the multiplication table of that number.
4. Write a program to find the factorial value of any number entered through the keyboard.
5. Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another.

Real-life Scenario-Based Questions:

1. A store owner wants to calculate the total cost of the items in a customer's shopping cart. Write a program that asks the user to input the prices and quantities of different items in the cart, and then calculate the total cost.

```cpp
#include <iostream>
using namespace std;

int main()
{
  double price, quantity, totalCost = 0;

  while (true) {
    cout << "Enter the price of the item: ";
    cin >> price;

    if (price < 0) {
      break;
    }

    cout << "Enter the quantity of the item: ";
    cin >> quantity;

    totalCost += price * quantity;
  }

  cout << "Total cost: " << totalCost << endl;

  return 0;
}
```

2. A school wants to calculate the average grade of 5 students in a class. Write a program that asks the user to input the grades of 5 students in a class, and then calculate the average grade.

```cpp
#include <iostream>
using namespace std;

int main()
{
  int grade, numGrades = 0;
  double totalGrade = 0;

  for (int i = 1; i <= 5; i++) {
    cout << "Enter the grade of student " << i << ": ";
    cin >> grade;

    numGrades++;
    totalGrade += grade;
  }

  double averageGrade = totalGrade / numGrades;

  cout << "Average grade: " << averageGrade << endl;

  return 0;
}
```

3. A person wants to calculate the total amount of money they have saved in a year. Write a program that asks the user to input the amount of money they save each month, and then calculates the total amount of money saved in a year.

4. A weather station wants to calculate the average temperature and humidity over a certain period (5 days). Write a program that asks the user to input the temperature and humidity readings for five days and calculate rates for the average temperature and humidity.

```cpp
#include <iostream>
using namespace std;

int main()
{
  double temperature, humidity, totalTemperature = 0, totalHumidity =
0;

  for (int i = 1; i <= 5; i++) {
    cout << "Enter the temperature for day " << i << ": ";
    cin >> temperature;
    cout << "Enter the humidity for day " << i << ": ";
    cin >> humidity;

    totalTemperature += temperature;
    totalHumidity += humidity;
  }
```

```
    double averageTemperature = totalTemperature / 5;
    double averageHumidity = totalHumidity / 5;

    cout << "Average temperature: " << averageTemperature << endl;
    cout << "Average humidity: " << averageHumidity << endl;

    return 0;
}
```

5. A company wants to calculate the total sales of its employees. Write a program that asks the user to input the sales data of different employees, and then calculates the total sales for each employee and the company.

6. Write a program that asks the user to enter the name and diameter of each planet in the solar system and print them in the Command Prompt. The program should then use a loop to print out the name and diameter of each planet.

7. Write a program that calculates the average distance from the Sun of all the planets in the solar system. The program should ask the user to enter the distance from the Sun for each planet, and then use a loop to calculate the average distance.

8. Write a program that calculates the total mass of the solar system. The program should ask the user to enter the mass of each planet, and then use a loop to calculate the total mass.

9. Write a program that calculates the average density of the planets in the solar system. The program should ask the user to enter the mass and diameter of each planet, and then use a loop to calculate the average density (mass divided by volume).

10. Write a program that keeps track of the number of copies of each comic book in a collection. The program should ask the user to enter the name and quantity of each comic book, and then use a loop to update the count for each comic book.

Problem-Solving Questions:

11. Write a program that calculates the sum of all the even numbers between 1 and a given number. For example, if the user inputs the number 10, the program should print out 30 (which is the sum of 2+4+6+8+10).

12. Write a program that calculates the sum of the squares of all the odd numbers between 1 and a given number. For example, if the user inputs the number 10, the program should print out 165 (which is the sum of 1+9+25+49+81).

13. Write a program that calculates the sum of all the numbers divisible by 3 between 1 and a given number. For example, if the user inputs the number 9, the program should print out 18 (which is the sum of 3+6+9).

14. Write a program that asks the user to input a positive integer, and then calculates the factorial of that number. The factorial of a number is the product of all the positive integers from 1 to that number. For example, the factorial of 5 is 12345=120.

15. Write a program that calculates the sum of the first n terms of the series $1 + 2 + 3 + ... + n$. The program should ask the user to enter the value of n, and then use a loop to calculate the sum.

16. Write a program that calculates the sum of the first n terms of the series $1 + 1/2 + 1/3 + ... + 1/n$. The program should ask the user to enter the value of n, and then use a loop to calculate the sum.

17. Write a program that calculates the sum of the first n terms of the series $1 + 1/4 + 1/9 + ... + 1/n^2$. The program should ask the user to enter the value of n, and then use a loop to calculate the sum.

18. Write a program to print out all Armstrong numbers between 1 and 500. If sum of cubes of each digit of the number is equal to the number itself, then the number is called an Armstrong number.

19. Write a program that calculates the sum of the first n terms of the series $1 - 1/2 + 1/3 - ... + (-1)^n/n$. The program should ask the user to enter the value of n, and then use a loop to calculate the sum.

20. Write a program that calculates the sum of the first n terms of the Fibonacci series (1, 1, 2, 3, 5, 8, ...). The program should ask the user to enter the value of n, and then use a loop to calculate the sum.